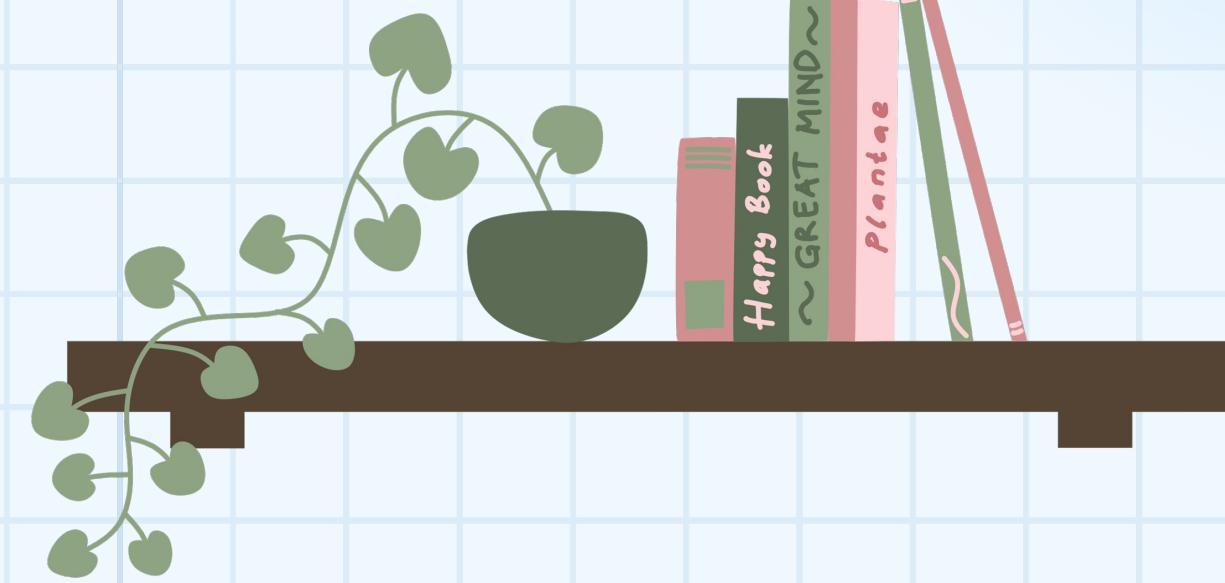
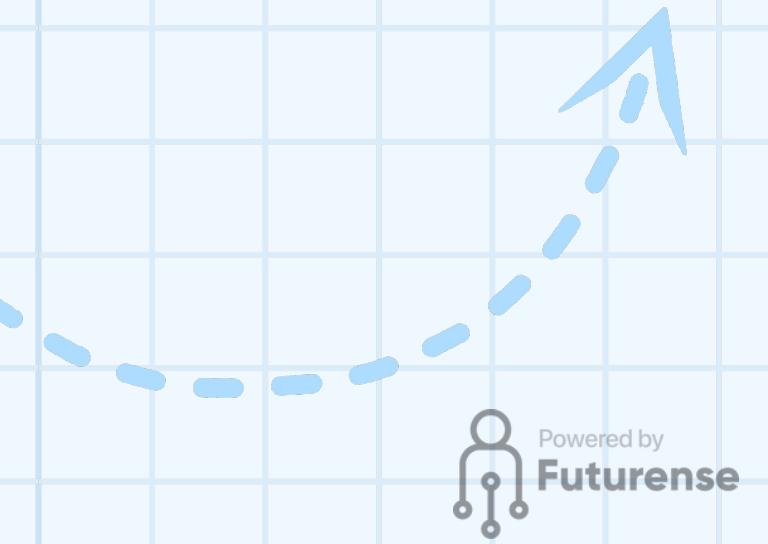
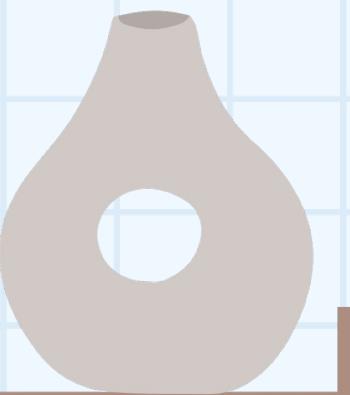




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**Applied AI and Data Science**

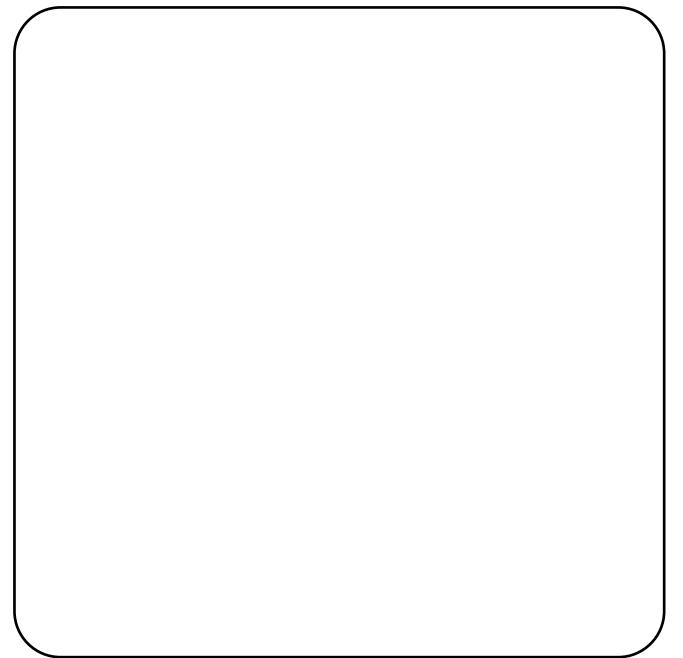
# **Algorithmic Thinking & its Applications**





# Basics of computers and programming

- What is a computer
- How to use programming languages?
- What are the components of a computer?
- How to communicate with computers?



DR. DIP SANKAR  
BANERJEE

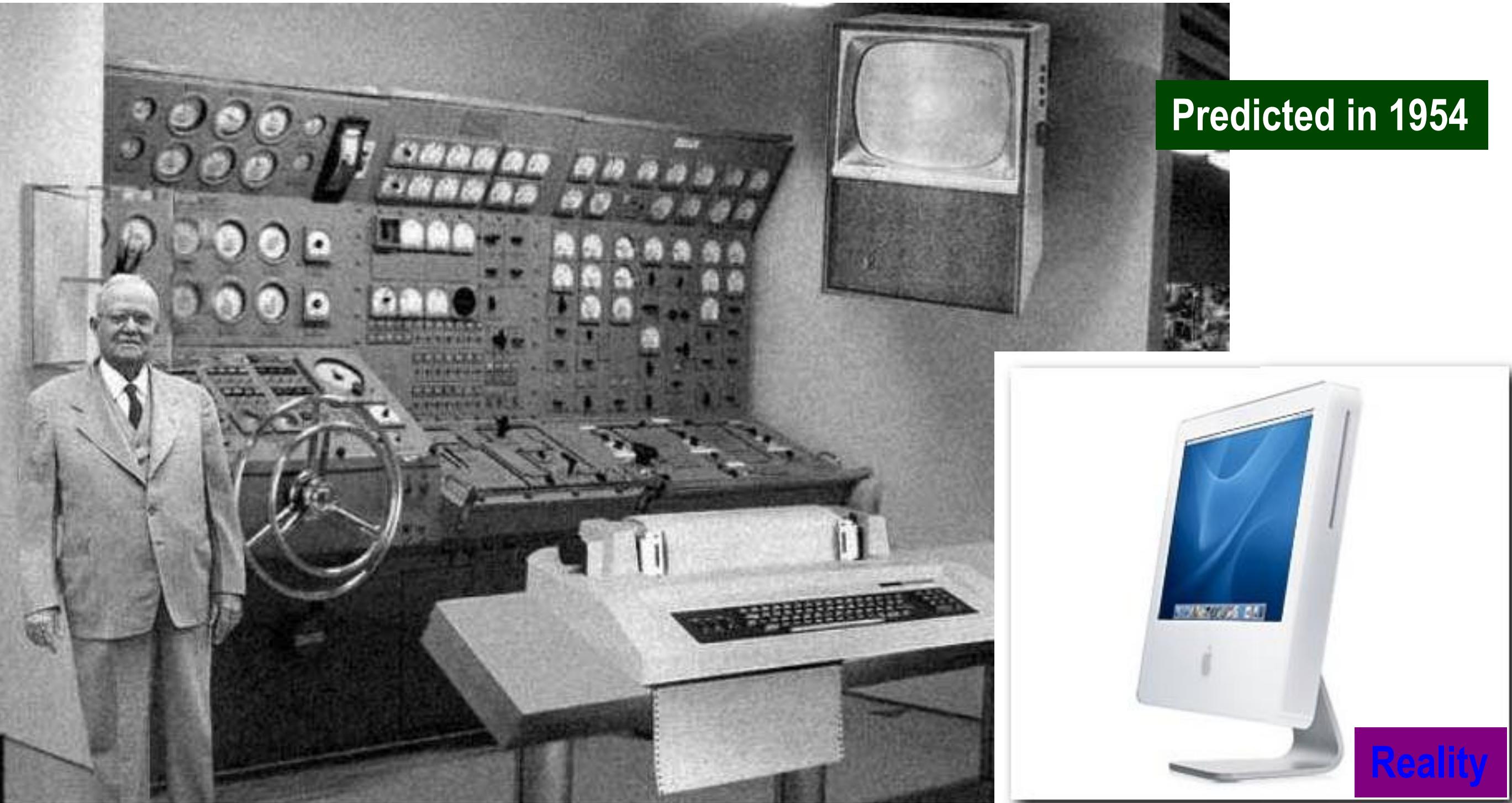


# What is a Computer ?



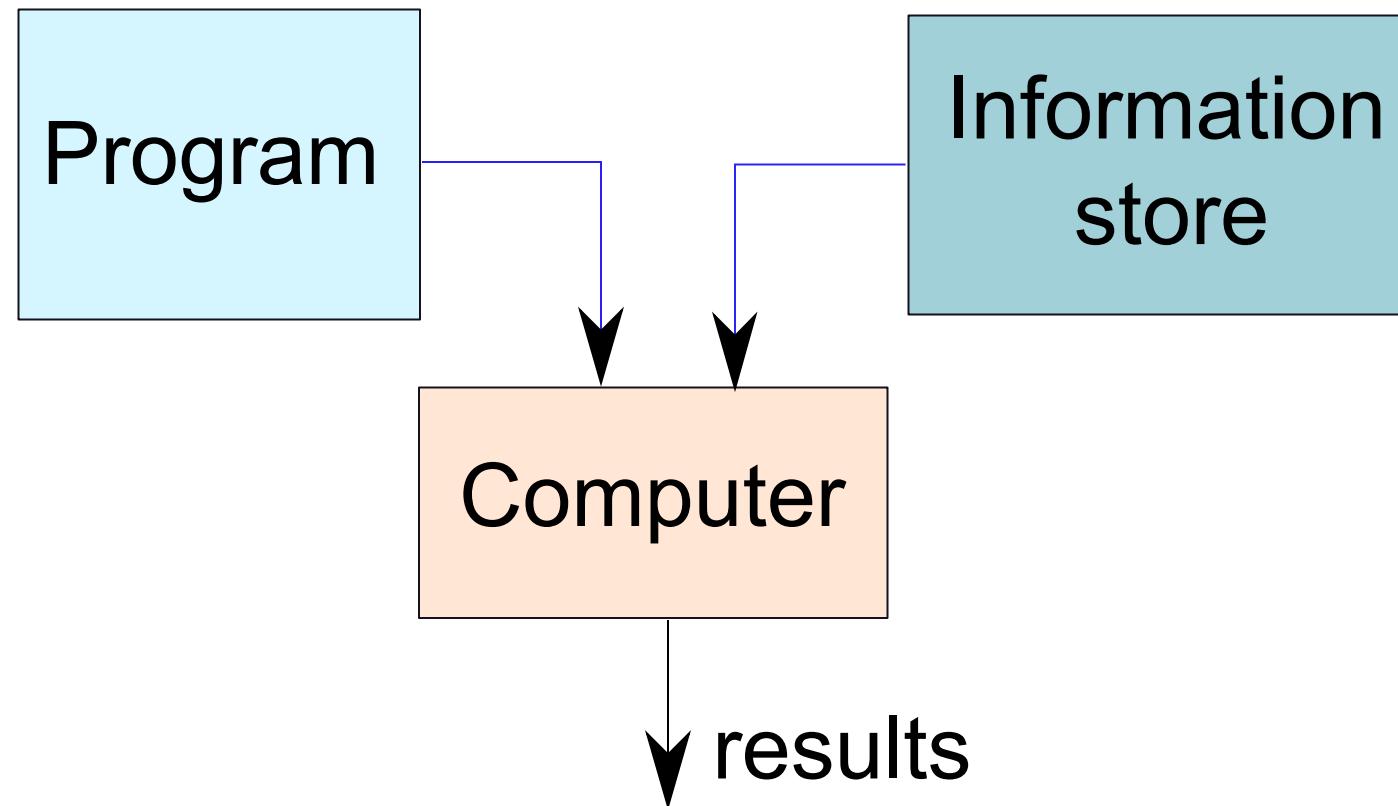
A computer is a general purpose device that can be programmed to process information, and yield meaningful results.





*Scientists from the RAND Corporation have created this model to illustrate how a "home computer" could look like in the year 2004. However the needed technology will not be economically feasible for the average home. Also the scientists readily admit that the computer will require not yet invented technology to actually work, but 50 years from now scientific progress is expected to solve these problems. With teletype interface and the Fortran language, the computer will be easy to use.*

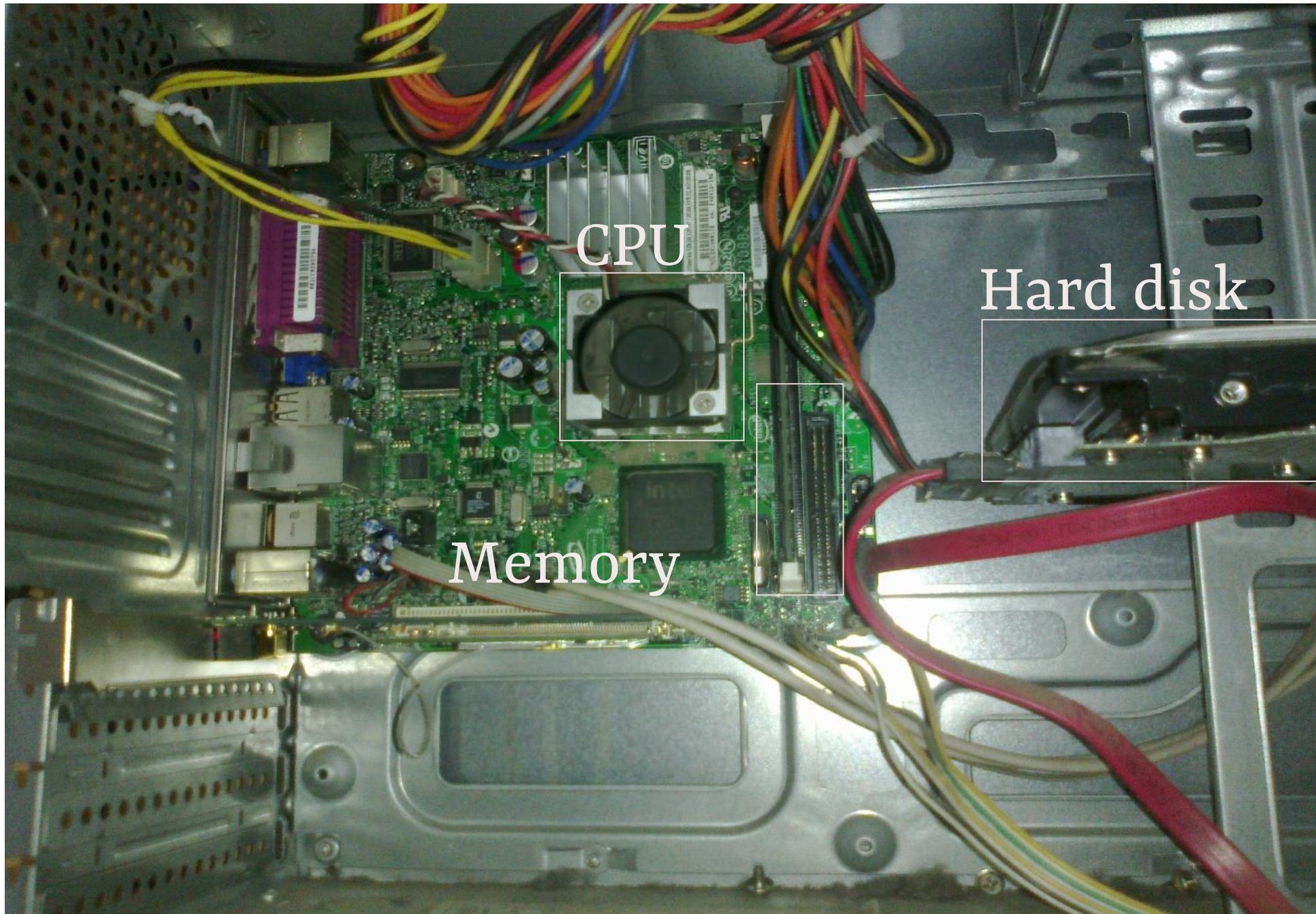
# How does it work ?

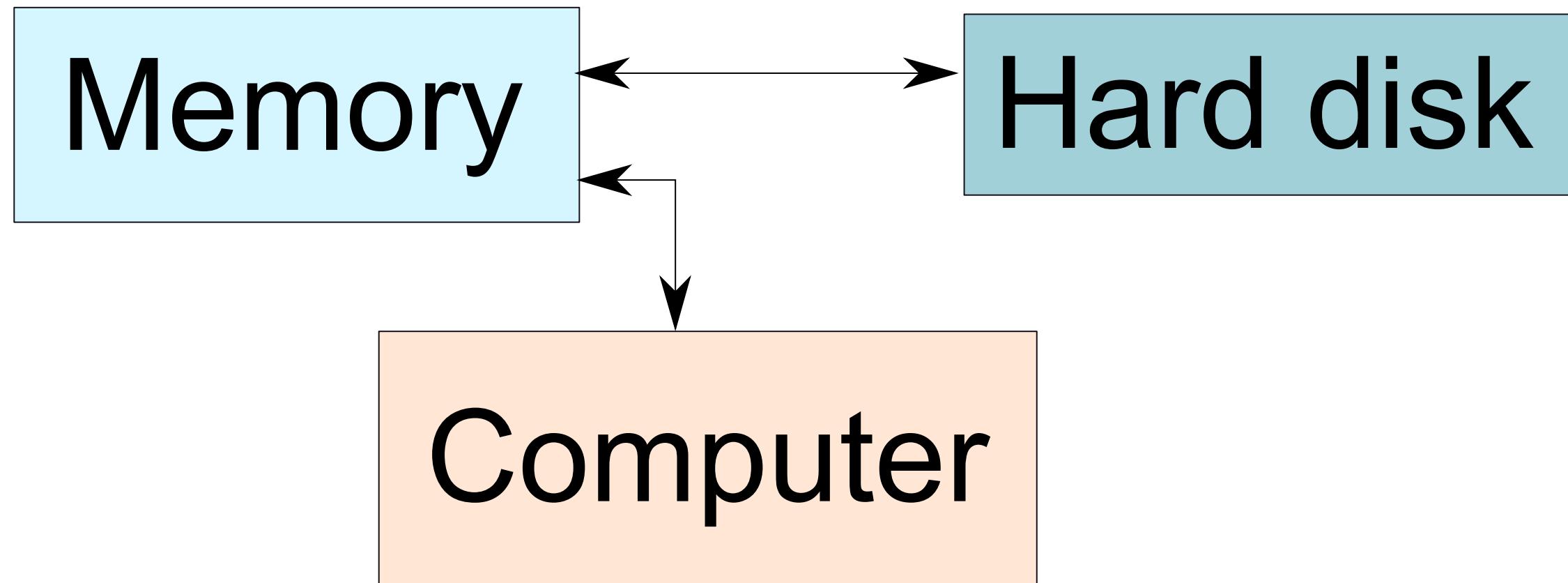


- Program – List of instructions given to the computer
- Information store – data, images, files, videos
- Computer – Process the information store according to the instructions in the program

# What does a computer look like ?

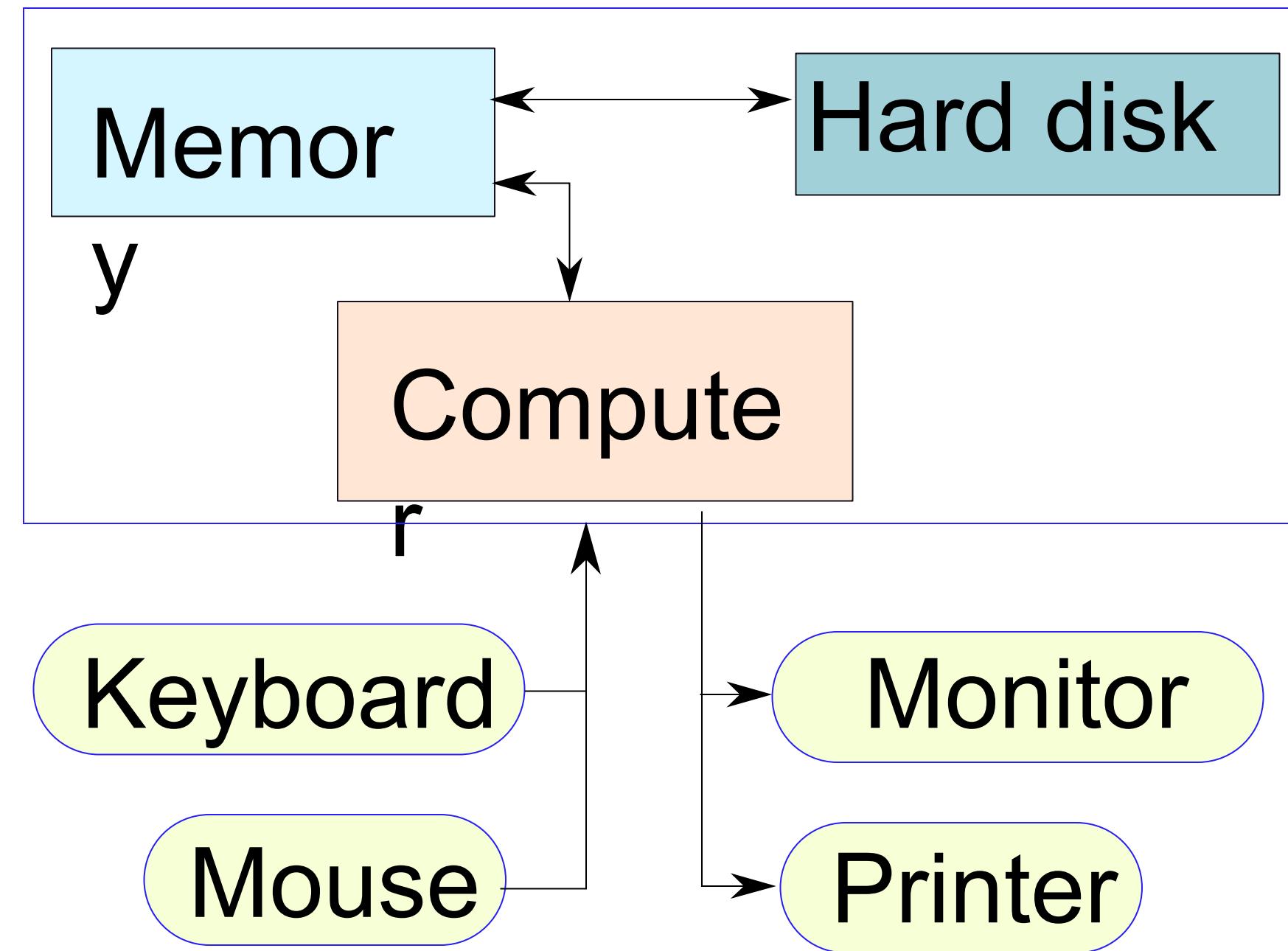
\* Let us take the lid off a desktop computer



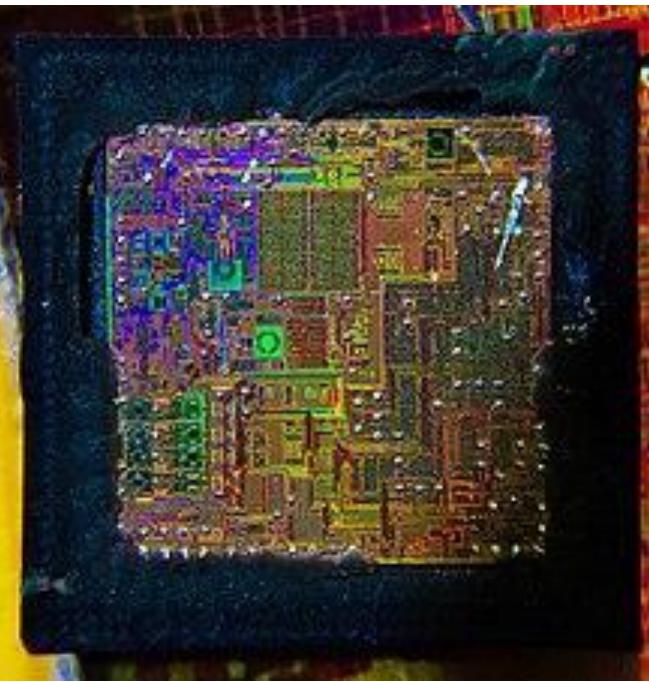
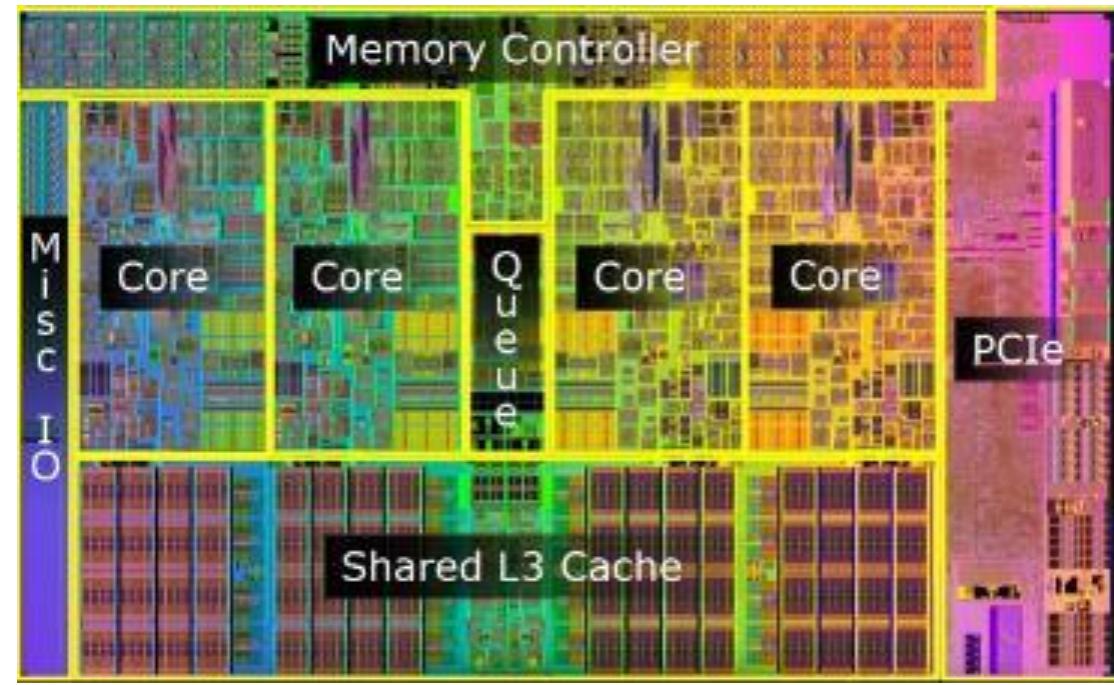


- Memory – Stores programs and data. Gets destroyed when the computer is powered off
- Hard disk – stores programs/data permanently

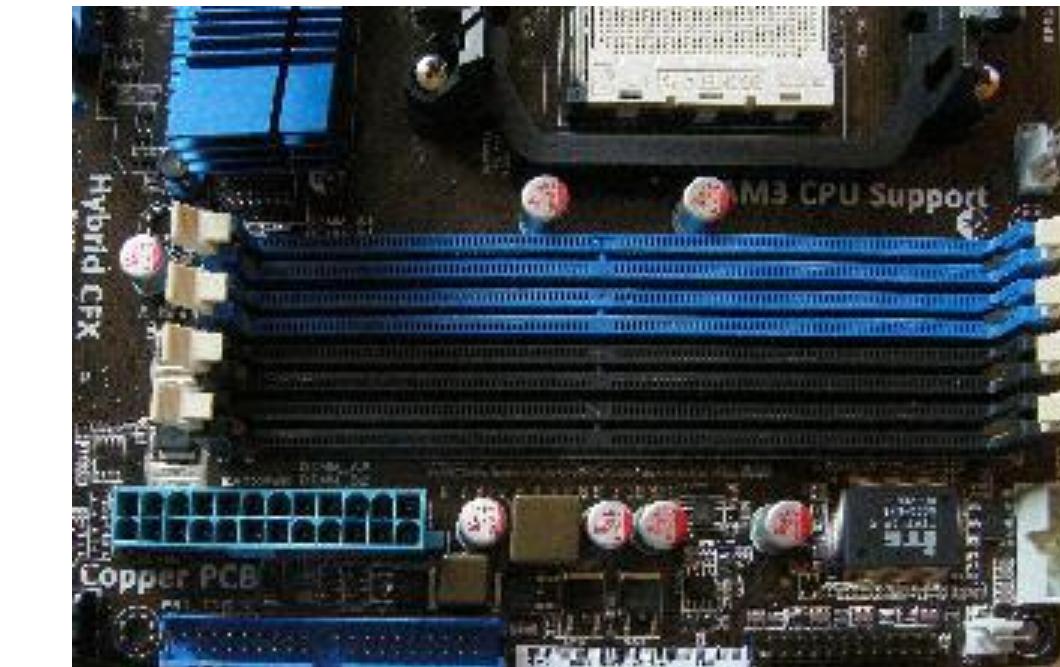
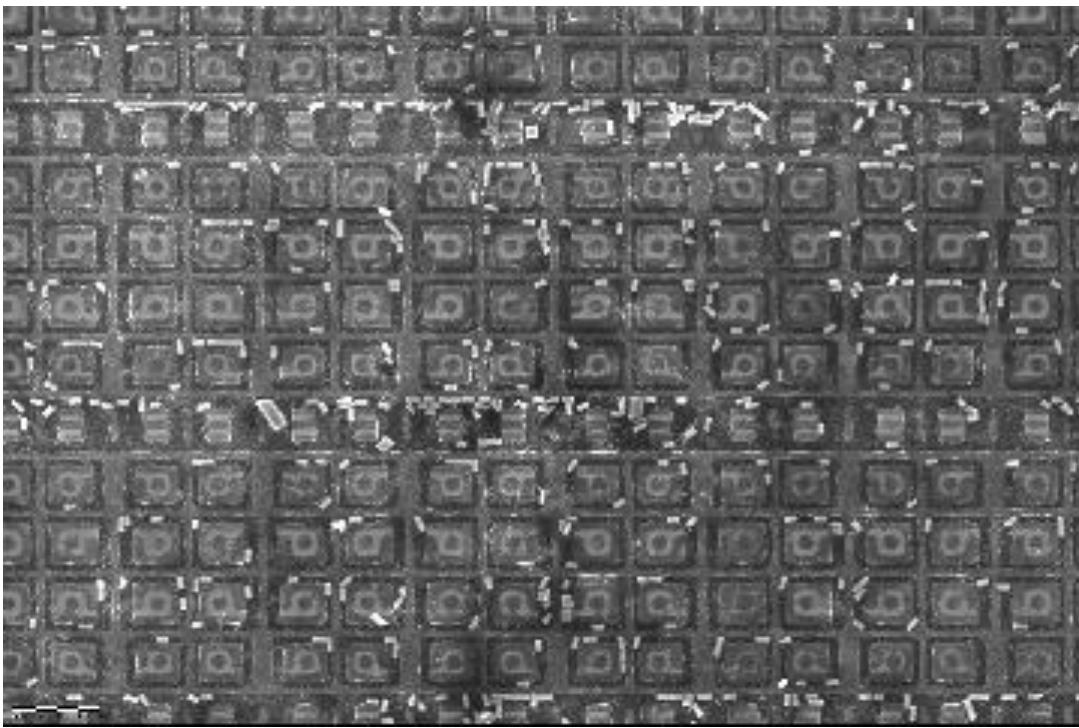
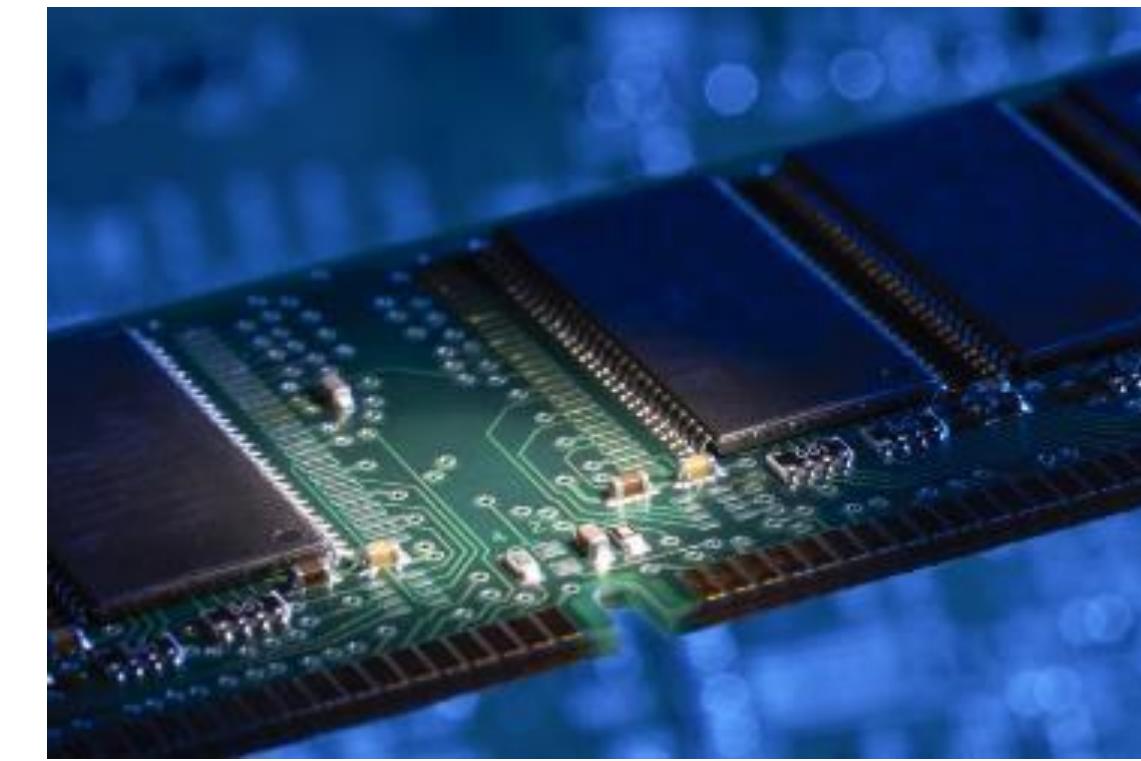
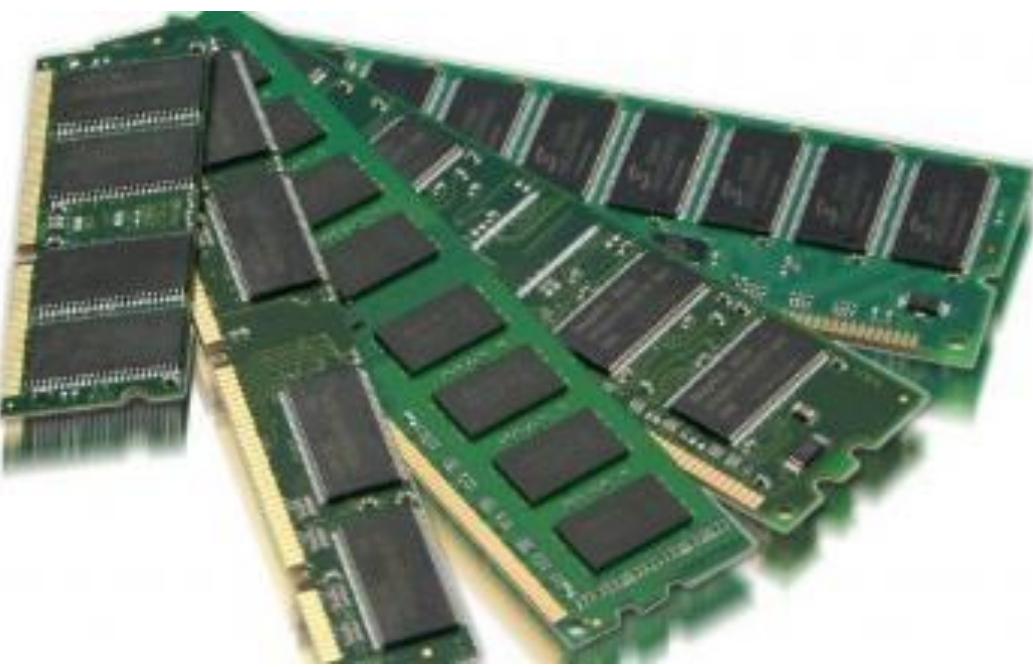
Let us make it a full system ...



# What is a Computer ? CPU



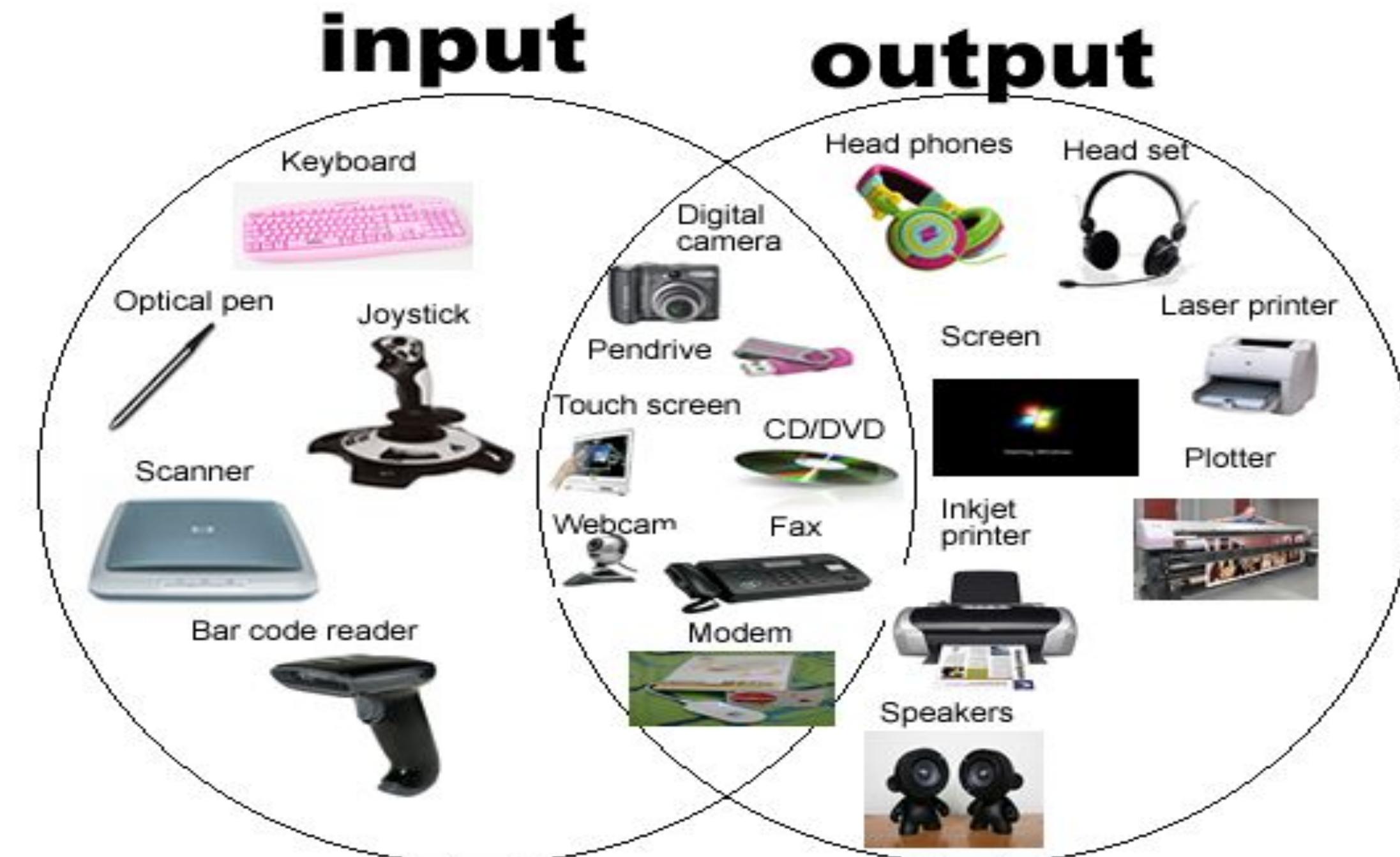
# What is a Computer ? Main Memory



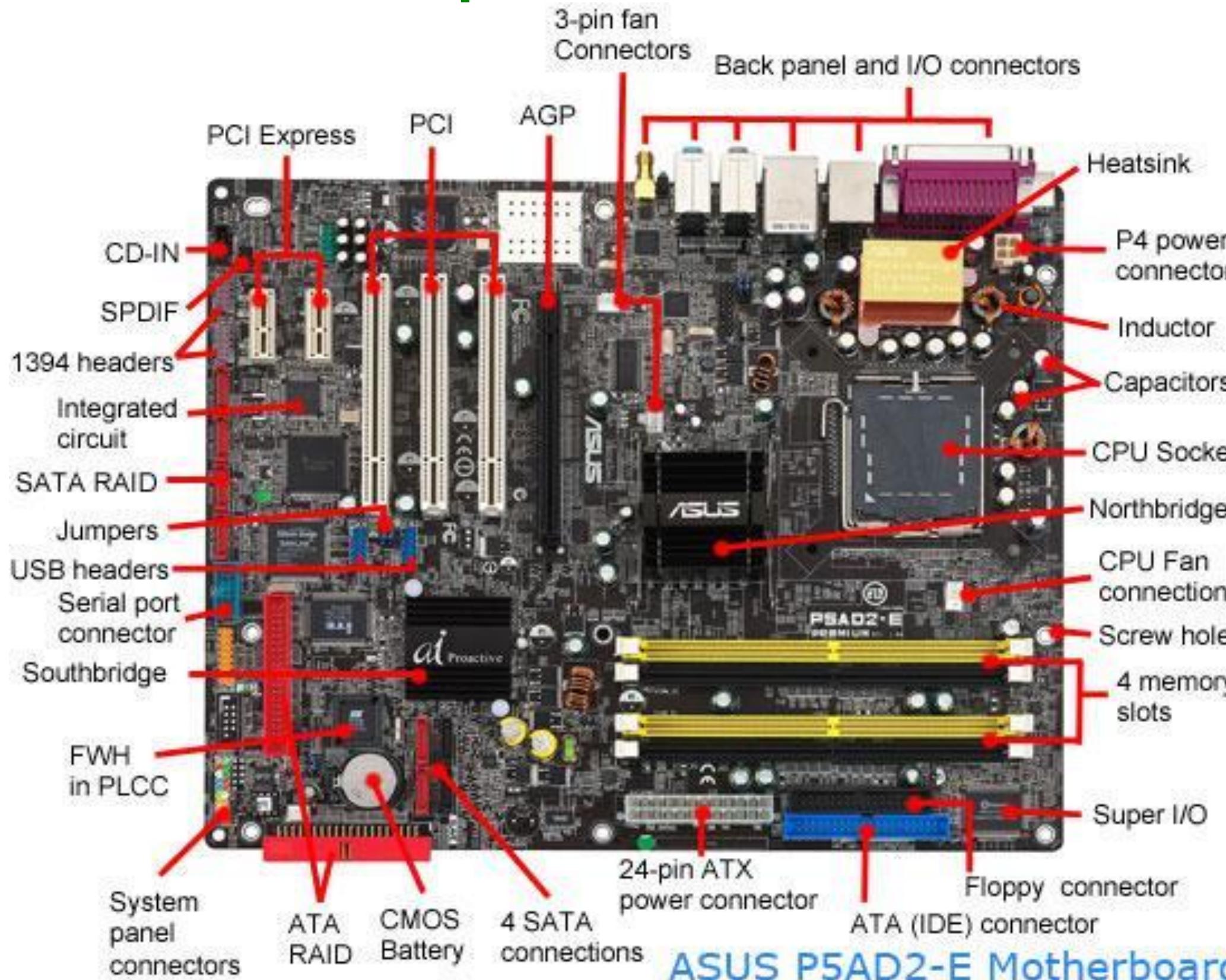
# What is a Computer ? Secondary Mem



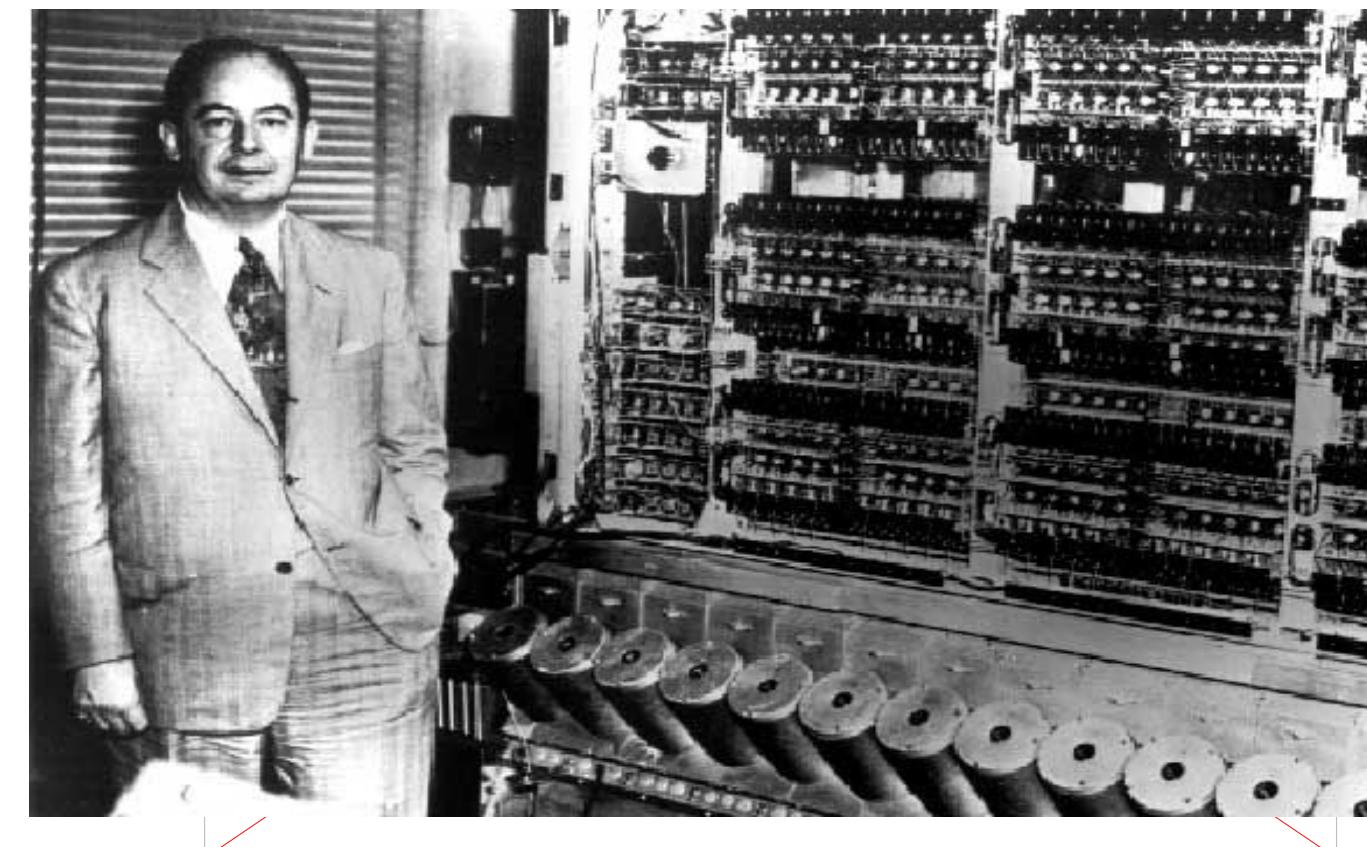
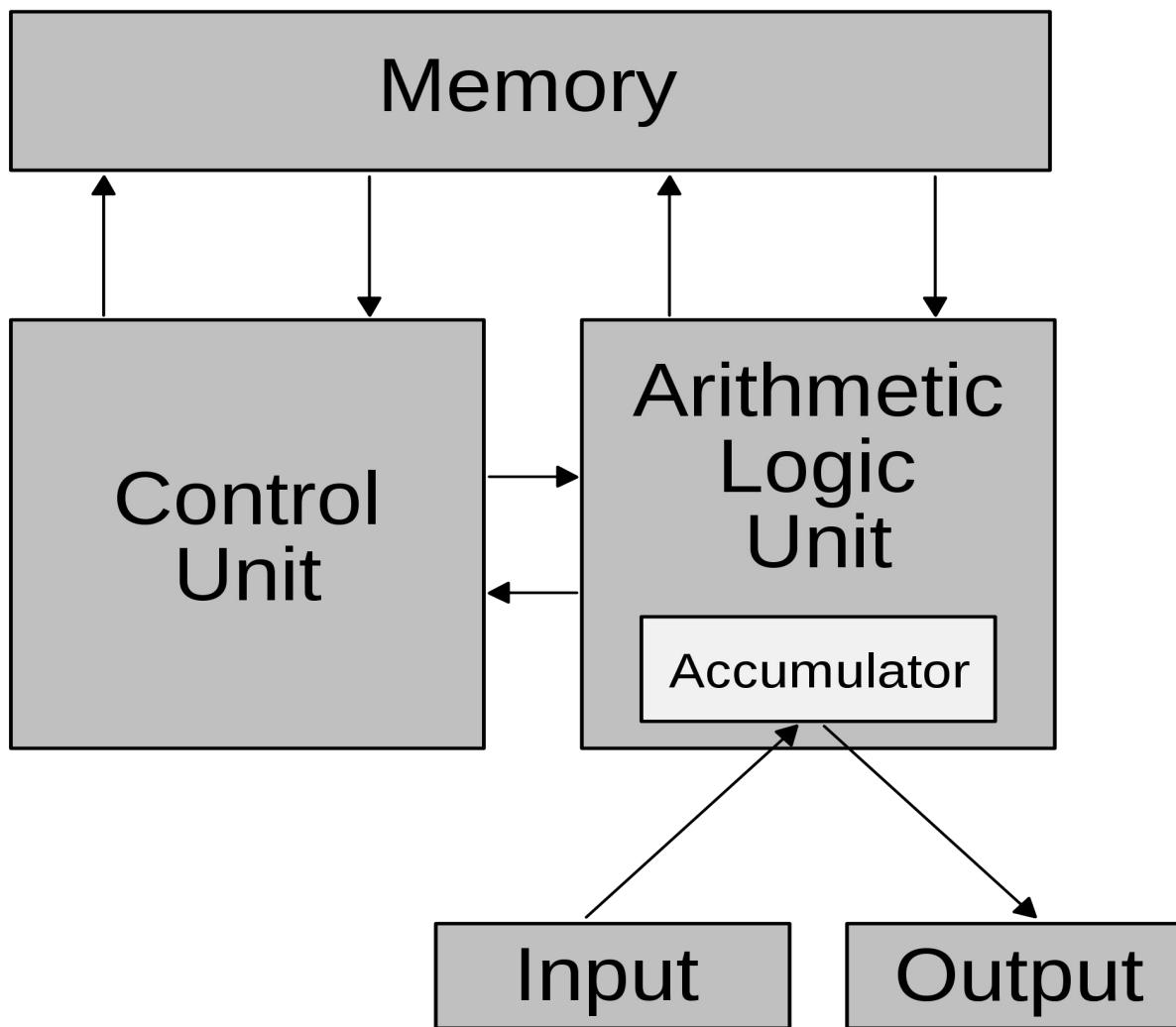
# What is a Computer ? I/O



# What is a Computer ? Motherboard

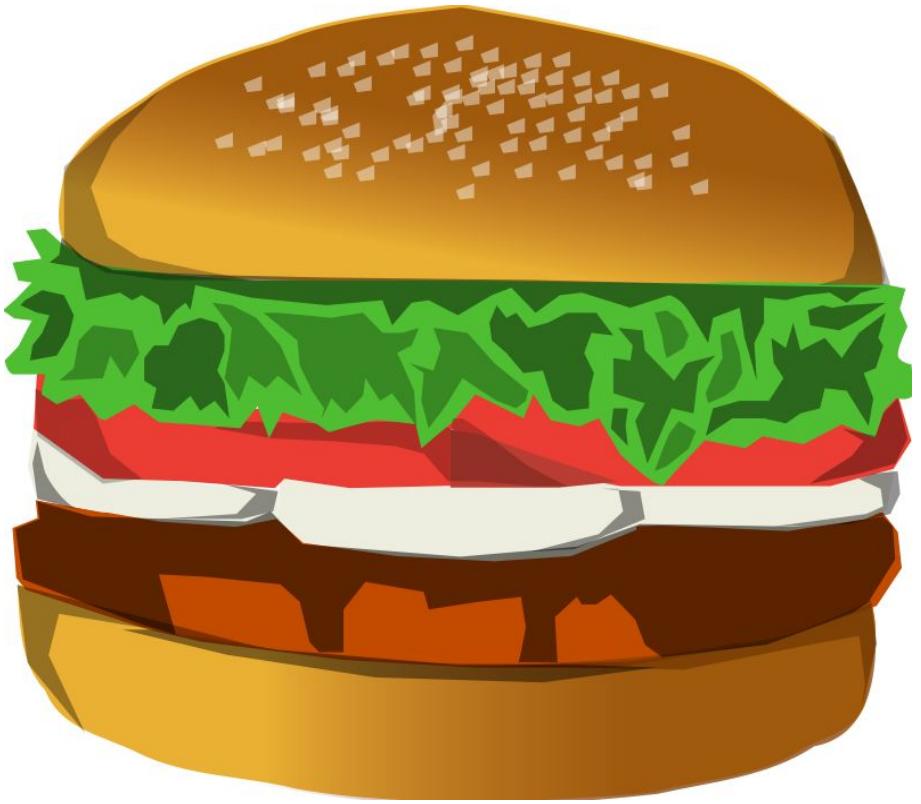


# Von-Neumann Architecture



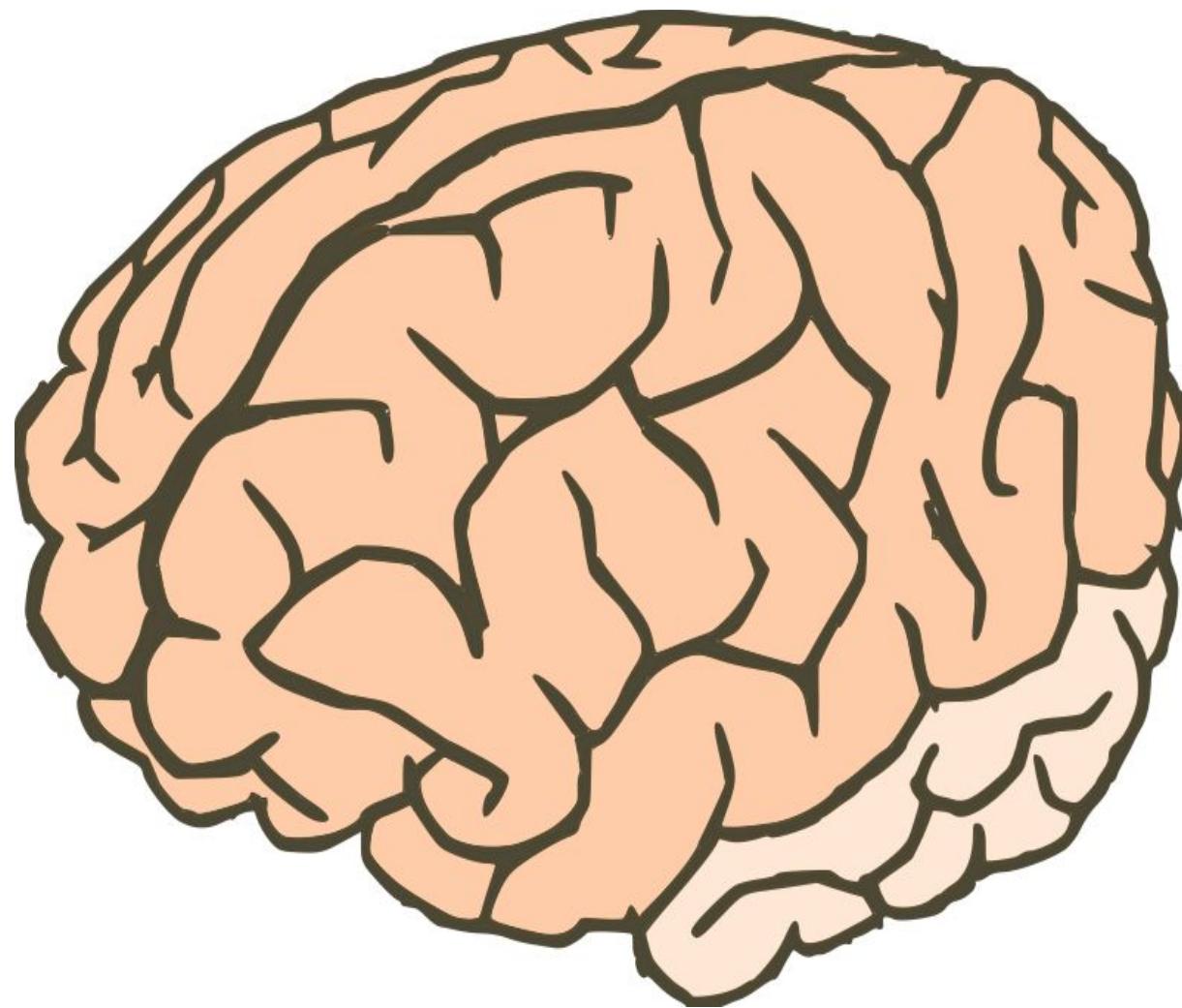
Source:  
[http://www.gap-system.org/~history/  
PictDisplay/Von\\_Neumann.html](http://www.gap-system.org/~history/PictDisplay/Von_Neumann.html)

# Food for Thought...



- What is the most intelligent computer ?

Answer ...



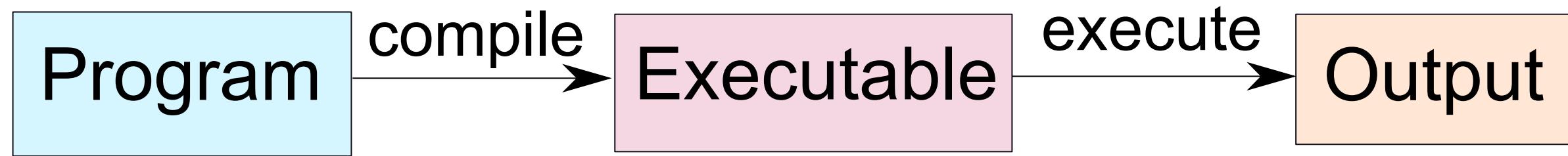
\* Our brilliant brains

# How is an Electronic Computer different from our Brain ?

Feature	Computer	Our Brilliant Brain
Intelligence	Dumb	Intelligent
Speed of basic calculations	Ultra-fast	Slow
Can get tired	Never	After sometime
Can get bored	Never	Almost always

\* Computers are ultra-fast and ultra-dumb

# How to Instruct a Computer ?



- \* Write a program in a high level language – C, C++, Java
- \* **Compile** it into a format that the computer understands
- \* Execute the program

# What Can a Computer Understand ?

- \* Computer can clearly **NOT** understand instructions of the form
  - \* Multiply two matrices
  - \* Compute the determinant of a matrix
  - \* Find the shortest path between Mumbai and Delhi
- \* They understand :
  - \* Add  $a + b$  to get  $c$
  - \* Multiply  $a + b$  to get  $c$



# Thank you

